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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,650	02/04/2005	Giuliano Cavaglia	CAVA3001/JEK	9565

23364 7590 04/06/2007

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EXAMINER	
LISTVOYB, GREGORY	
ART UNIT	**PAPER NUMBER**
1711	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/523,650	CAVAGLIA, GIULIANO	
	Examiner	Art Unit	
	Gregory Listvoyb	1711	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *55-108* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *56,59-63 and 84-107* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *57,58,64-83 and 108* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/4/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group 1, claim(s) 56, 59-63, 84-107, drawn to process for polymerization of polyesters.

Group 2, claim(s) 57-58, 64-83 and 108, drawn to apparatus for polymerization of polyesters. The inventions listed as Groups 1 and 2 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The invention as claimed in independent claim 1 does not define a special technical feature distinguishing the claimed invention over the prior art. The process for the solid phase polymerization of polyesters as claimed in claim 1 are fully anticipates by, for example, disclosure of US Patent 3075952 to Coover et al.

During a telephone conversation with J. Ernest Kenney on 2/27/07 a provisional election was made with traverse to prosecute the invention of Cavaglia, claims 56, 59-63, 84-107. Affirmation of this election must be made by applicant in replying to this Office

action. Claims 57-58, 64-83 and 108 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

Claims 56, 59-63, 82-84, 86-87,89, 92, 95-96, 101-102, 104, 107 rejected under 35 U.S.C. 102(b) as being anticipated by Coover et al (US patent 3075952) herein Coover.

Regarding claims 56, 59, 60, 82-84, 86-87, 101-102, 104 and 107 Coover discloses a process for the solid phase continuous polymerization of polyesters, comprising the following steps:

- feeding crystallised granules at a temperature within the range 170 °C - 300°C (Column 2, line 25) into an horizontal, cylindrical, rotary reactor, which is being slightly inclined (Column4, line 20 and Column 5, line 15); producing a purge gas flow inside said reactor (Column 2, line 25), which fluidize the particles; causing the intrinsic viscosity (IV) of polyester to increase typically on 0.4 units (column 5, line 35).

Regarding claims 82, 83, 86 and 87 Coover teaches a reactor purge with dried oxygen-free Nitrogen (Example 1B) with flow rate up to 1000 ml/min per gram, which makes gas/polymer weight ratio of up to 1.3.

In reference to claims 89, 92 and 95 Coover discloses a polyester, based on terephthalic acid (Claim 9), polymerized in 1:1 ratio with glycol. The initial IV is within the range of 0.1-0.4, which meets the limitation of Claim 95 regarding carboxyl groups content.

In reference to Claim 96 Coover teaches particles more than 5 mm (Column 2, line 30) or less than 3 to 5 mm (Column 5, line 55).

Regarding claims 59 and 61-63, Coover teaches crystalline prepolymer, which feeds the first reactor (Example 6b)

Claims rejected under 35 U.S.C. 102(b) as being anticipated by Barkey et al (GB patent 1190801 and US patent 3497477) herein Barkey.

Regarding claims 56, 59, 60, 82-84, 86-87, 101-102, 104 Barkey discloses a process for the solid phase continuous polymerization of polyesters, comprising the following steps:

feeding crystallised granules at a temperature in the range 160 °C - 210°C (page 2, line 70) into an horizontal, cylindrical, rotary reactor, which is being slightly inclined (page 4, line 55 and page 5, line 5); producing a purge gas flow inside the reactor (page 5, line 75), which fluidize the particles and contains oxidizable material for aldehyde removal (page 2, line 120).

Claim Rejections - 35 USC § 103

Claims 97-100 rejected under 35 U.S.C. 103(a) as being unpatentable over Coover.

Coover discloses a process for the solid phase continuous polymerization of polyesters, comprising the following steps:

- feeding said crystallised granules at a temperature in the range 170 °C - 300°C (Column 2, line 25) into an horizontal, cylindrical, rotary reactor, which is being slightly inclined (Column4, line 20 and Column 5, line 15); producing a purge gas flow inside said reactor (Column 2, line 25), which fluidize the particles; causing the intrinsic viscosity (IV) of polyester to increase typically on 0.4 units (column 5, line 35).

Coover teaches particles more than 5 mm (Column 2, line 30) or less than 3 to 5 mm (Column 5, line 55).

Regarding Claims 97-100 Coover does not teach the shapes of polyester particles.

However, it would be obvious to a person with ordinary skills in the art that particle size and shape (i.e. surface area at given mass) is the most important factor for diffusion of water from the particles. At high surface area equilibrium of post polymerization reaction shifts to molecular weight increase, which makes a process more efficient.

Claim 85 rejected under 35 U.S.C. 103(a) as being unpatentable over Coover.

Coover discloses a process for the solid phase continuous polymerization of polyesters (see discussion above). Coover teaches that the dried air can be used in the process (Column 2, line 65).

He does not teach an air with a dew point less than –30C as a purge gas.

Therefore, it would be obvious to a person with ordinary skills in the art to use sufficiently dried air in the process to reduce a cost of the process.

Claim 88 rejected under 35 U.S.C. 103(a) as being unpatentable over Coover.

Coover discloses a process for the solid phase continuous polymerization of polyesters (see discussion above). He teaches that purge gas can be recycled into the first reactor (Column 5, line 60). In this case the flow rate of the gas is very high (more than 1000 ml/min) in order to keep a level of water and organic impurities low (Column 60, line 60).

Coover does not teach a purification step of recycled gas.

However, it would be obvious to a person with ordinary skills in the art to purify outgoing gas with, for instance, molecular sieve columns in order to reduce undesirable oxidation and subsequent coloration of the resin.

Claims 61-63, 90-94 and 103-104 rejected under 35 U.S.C. 103(a) as being unpatentable over Rinehart et al (US patent 4876326) herein Rinehart in combination with Coover.

Regarding claims 61-63, 90-94, 103-104 Rinehart discloses a process of solid state polymerization of terephtahlates (including polybutylene terephthalates, Column 4, line 50), isophthalates (Column 4, line 25), naphthalates (Column 4, line 30) and their mixtures, where polyester has starting IV within the range of 0.1-0.7 dl/g (Column 3, line 60). The polyester typically has a crystallinity between 20 and 40% with crystallization time of 5 min (Column 8, line 15) at temperature below sticking one (230C).

Rinehart does not teach that his tubular reactor is slightly inclined.

Coover discloses slightly tilted reactor.

It would be obvious to a person with ordinary skills in the art to use a reactor with effective mixing of the components and shortest pathway of outgoing gases through the polymer particles.

Claims 97-100 rejected under 35 U.S.C. 103(a) as being unpatentable over Duh et al (US patent 5449701) herein Duh in combination with Coover.

Duh discloses a solid-state polymerization for polyethylene naphthalate. He teaches that feeding prepolymer typically contains solid granules in the shape of pellets, spheres, chips or cubes. Those shapes are advantageous since the formation of undesirable very high molecular weight fraction is reduced (column 1, line 20).

Duh teaches that although at smaller particle size the reaction is more effective due to better diffusion, very small particles has a tendency to stickiness. Therefore there is a limitation for minimal particle size in solid state polymerization (column 1, line 30).

Duh
~~Rinehart~~ does not teach that his tubular reactor is slightly inclined and particle size range.

Coover discloses slightly tilted reactor and particles more than 5 mm (Column 2, line 30) or less than 3 to 5 mm (Column 5, line 55).

It would be obvious to a person with ordinary skills in the art to use prepolymer in form of sphere, cylinder, pancake (chips) or their mixture (irregular) in order to reduce content of very high MW fraction in final polyester.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory Listvoyb whose telephone number is (571) 272-6105. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Gregory Listvoyb
Examiner
Art Unit 1711

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James J. Seidleck
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